The Virtual Hospital: Internet Publishing as an Efficient and Effective Means for Delivering Continuing Medical Education

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Introduction

The dominant paradigm of Continuing Medical Education (CME), the centralized lecture separated from the clinical encounter, is an inefficient and ineffective learning technique. To make CME efficient and convenient it should be delivered in a decentralized manner at the health care provider's convenience. To make CME effective is should be delivered in the setting of a real clinical context, thus increasing the educational effectiveness of the learning experience. We are developing a technique, using the World-Wide Web and Internet, that will allow CME to be distributed in an efficient and effective manner.

Technique

The Virtual Hospital is implemented using the following open Internet standards. This allows for its future expandability and for complete interoperability and integration with other medical information systems.

• Information Organization - Information is stored as Hypertext Markup Language (HTML) files and organized on a World-Wide Web server, an Internet standard for information organization.

• Information Indexing - All information is indexed and made free-text searchable using Glimpse, an Internet standard for information indexing and searching.

• Information Distribution - All information is transmitted across the Internet, using the Transmission Control Protocol / Internet Protocol (TCP/IP) which is the Internet standard for information transmission.

• Information Display - The HTML files are displayed on any brand of personal computer capable of running a World-Wide Web client, such as Netscape. World-Wide Web clients exist for all major personal computers today - Windows, Macintosh, and Unix - and should exist for all future personal computers as well. The World-Wide Web client has a simple and intuitive to use graphical user interface that makes it easy to learn and master.

• User Testing - Once users have completed a CME course, their knowledge is assessed through an on-line test. The test is created by the CME course author using a Common Gateway Interface (CGI) script we have created called TestMaker. CGI scripts are an Internet standard for adding interactive features to a World-Wide Web server. Once the user takes the test using a CGI script we have created called TestTaker, the results are shipped electronically to our Office of Continuing Medical Education. The user may choose to pay for their CME credits electronically using a credit card on the Internet or via more traditional means such as a standard check.

• Information Security - Access to information on the Virtual Hospital is controlled by means of Access Control Lists (ACLs). The Secure Socket Layer (SSL) protocol is an Internet standard for security encompassing user authentication, data encryption and data integrity that allows for secure communications between World-Wide Web servers and World-Wide Web clients. The data encryption technique is the RSA encryption standard.

Current Status

Our first CME course on the Virtual Hospital, The Clinical Laboratory Improvement Act (CLIA) and the Physician's Office Laboratory, has been on-line for one year. We are currently creating a number of other CME courses and lectures.

Future Plans

Our ultimate goal is to integrate the awarding of CME into the daily workflow of health care providers as they use our institutional Integrated Academic Information Management System (IAIMS).

Reference

D'Alessandro MP, Galvin JR, Erkonen WE, Curry DS, Flanagan JR, D'Alessandro DM, Lacey DL, Wagner JR. The Virtual Hospital: An IAIMS Integrating Continuing Education into the Workflow. M.D. Computing 1996; 13:323-329.

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